

# **Art Investment Portfolios**

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<p>Sammandrag:</p> <p>Ämnet för avhandlingen är efterfrågan på alternativa investeringar såsom konst och dess värde som ett diversifierings verktyg för ett investeringsportfölj. Det teoretiska ramverket bygger på ekonomiska teorier, av moderna portföljteoretiker Markowitz, som ofta används av investerare runt om i världen. Varje investerare strävar att få högsta möjliga avkastning med lägsta möjliga risk, av denna anledning finns en konstant letan efter trygga alternativ. Forskningen ställer frågan om konsten kan vara den nya attraktiva alternativa placeringar, som genom att tilläggas i investeringsportföljen kan bidra till att sänka den totala risken.</p> <p>En introduktion görs till världen av investeringar och begreppet alternativa investeringar diskuteras. I avhandlingen behandlas efterfrågan på den konst som har uppvisat en kraftig tillväxt under de senaste åren. De metoder som används har teoretisk grunder och testas empiriska på data. De moderna portföljteorierna är testad på dessa två indexer MEI MOSES® ALL ART WORLD INDEX© och MSCI World Performance Index©. Analysen av de uppgifter som uppnåts i beräkningarna gör det möjligt att dra slutsatser samt konstatera positiv effekt.</p>	
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<p>Abstract:</p> <p>The topic of the thesis is the demand for alternative investment such as art and its value as a diversification tool for an investment portfolio. The theoretical frame work was based on the founding financial theories, the Modern portfolio theory by Markowitz, which is widely used by investors around the world. Every investor looks at receiving highest possible return with the lowest possible risk, for this reason there is a constant look for safe havens. The research question raised the topic of art being the new attractive alternative asset, which by including into ones investment portfolio can help to lower the overall risk.</p> <p>An introduction in to the world of investment is made and the concept of alternative investments discussed. The thesis looks at the demand for the Art that has seen large growth in the recent years. The methods used were theoretical research and empirical data evaluation. The Modern Portfolio Theory is tested on the two Indexes MEI MOSES® ALL ART WORLD INDEX© and MSCI World Performance Index©. The analysis of the data attained from the calculations enables to draw the conclusions and of the Arts positive effect on the overall risk reduction of the portfolio.</p>	
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<p>Tiivistelmä:</p> <p>Opinnäytetyön aihe on kysyntää vaihtoehtoisten sijoitustuotteiden kuten taide ja sen arvon monipuolistaminen sijoitussalkussa. Teoreettinen viitekehys työ perustuu Markowitzin teorioihin jotka käytetään yleisesti sijoittajoiden keskuudessa ympäri maailmaa. Jokainen sijoittaja pyrkii samaan korkeimman mahdollisen tulon mahdollisimman alhaisella riskillä, tästä syystä on jatkuvasti etsintää turvallisten vaihtoehtojen löytämiseksi. Tutkimus työn aihe nostaa taiteen uudeksi houkuttelevaksi vaihtoehdoksi, joiden lisäämällä osaksi sijoitussalkkua voi auttaa pienentämään kokonaisriskiä.</p> <p>Johdanto investointimailmaan tehdään ja käsite vaihtoehtoiset sijoituskohteet keskustellaan. Opinnäytetyössä tarkastellaan taiteen kysyntää, joka on nähnyt suurta kasvua viime vuosina. Käytetyt menetelmät ovat teoreettisesti tutkittuja ja empiiristen arvojen kanssa testattuja. Moderni teoria on testattu seuravien indeksien kanssa MEI MOSES® ALL ART WORLD INDEX© ja MSCI World Performance Index©. Tietojen analysoinnin on saavutettu ja laskelmista voi tehdä päätelmiä taiteen myönteisestä vaikutuksesta yleiseen riskin pienentämiseen.</p>	
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## **FOREWORD**

I would like to thank you to Mr. Andreas Stenius for the help and support in the journey!

Also I would like to thank all the teachers in Arcada University of Applied Sciences for these great years spend, for all the knowledge and experience that they so generously shared! University years are truly the golden days of ones life!

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Thank you!

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# 1 INTRODUCTION

In this time of turbulence that the world is living in, people are looking for alternative sources of investment. "People have less and less confidence - you can see in what's happening with the euro right now - in paper money and more confidence in real things that are lasting, art being one of them," said Berggruen, who ranked No. 158 on the Forbes list of the 400 richest Americans in 2009. (Reuters, 2010)

A report by Cap Gemini and Ernst & Young reckons that the rich put around 10% of their wealth into alternatives. Multiple articles and TV programs on BBC show that the alternative investments are growing in demand now due to the financial crisis, as people want to invest in to something more stable and tangible. Could it be that investing in tangible assets is the cheapest insurance? (Saelensminde, 2010)

In the recent years where the attention of the financial institutions was focused on the common financial instruments such as stocks and bonds, it became clear that the majority do not have a real level of understanding the alternative assets. To quote Warren Buffett, you should never invest in anything you don't understand. (Fraser-Sampson, 2011)

The purpose of this study is to learn more on the concept of alternative investments and examine the possibility of including alternative investment into ones investment portfolio, concentrating on Art (painting and sculptures).

## 1.1 Purpose of the study

The purpose of this study is to investigate the potential benefit of using the alternative investments such as Art in lowering the risk of the investment portfolio. In addition, to investigate the risk aversion benefits of the Modern Portfolio Theory (MPT) and the benefit of alternative investments as a risk aversion method. The research will provide the background in to the alternative investments and the strategies of risk aversion in order to determine weather or not alternatives are an essential part of the portfolio and validate the demand for the alternative in times of turbulence.

The main research question is:

Is investing into alternative investments, such as art, a great diversification tool for minimizing the risk of an investment portfolio.



Sub-questions:

What are the risk aversion strategies?

Are alternative worth the price/value or are they more of an emotional buy?

The target for analyzing the value for risk aversion in alternative investment will be investments in to Arts, in particular paintings. For that an art index and its correlation with a regular Index portfolio will be analyzed.

## 1.2 Structure of the study and methods

The thesis will be divided in to three parts. First part will be theoretical will introduce the reader to background of finance and with the Modern Portfolio Theory and give an overview to other risk aversion techniques. It will also include discussions on the background of alternative investments. Second part is empirical and will consist of applying the MPT to the two indexes, a common stock portfolio MSCI World Index (MSCI Inc.©)and the Art Index (Beautiful Asset Advisor LLC).The third part of the thesis includes results, recommendations and summary. The conclusion summarizes the collected data and answers to all the thesis questions, leaving also new questions for further studies.

Methods used will be theoretical research and empirical research.

## 2 FINANCE AS THE STUDY OF FUNDS AND RISK MANAGEMENT

“Finance is the science that describes the management of money, banking, credit, investments, and assets.” (Investopedia UCL)Finance rotates around the concepts of lending and borrowing money as well as the relationship between time, risk and money value. One of the co-founders of the financial theory is Irving Fisher, his 1930 “Separation Theorem provided corporate management with a lifeline base on what is now termed Agency Theory.” (Hill, 2010) The main stream financial theory is based on two concepts, that all management and investor behavior is rational and risk averse. (Hill, 2010)

## 2.1 Investments

In a broader sense an investment can be described as a process aimed at maintaining and increasing the monetary or other value of ones wealth in a period of time and taking on a certain risk level. (Investopedia UCL)

As R. Hill also put it an investment is the current commitment of dollars for a period of time in order to derive future payments that will compensate the investor for

1. The time the funds are committed,
2. The expected rate of inflation, and
3. The uncertainty of the future payments. (Hill, 2010)

In order to multiply ones worth different financial instruments are used. Financial instruments -are different forms of financial liabilities, both long-and short-term, which are bought and sold on the financial markets. The financial instruments generally include:

- securities (basic and derived);
- alternative investments, art collection buildings etc;
- precious metals;
- foreign currency;
- shares, etc.;

(Semenkova, 1997)

Securities are the most used form of investment for both corporate, government and private investors. Following the rule that every investor is looking for best balance between risk and profit, investments are generally not made into just one security but in a few which then forms what is known as an “investment portfolio”. In other words the investment portfolio is a collection of securities which can range from stocks, bonds, derivatives and other alternative investments. It can be said that the investment process can be broken down in to five steps

1. Choosing the investment policy
2. Analyzing the market
3. Forming the investment portfolio
4. Revision of the investment portfolio
5. Evaluating the investment portfolio

The overall goal of the investment portfolio is attaining the highest yield at lowest acceptable risk. An investment portfolio has multiple benefits to the investor:

- By investing in to a combination of securities one can achieve a level such investment qualities which would not appear if investing into one ;
- The skilful selection and portfolio management enables the optimal combination of profitability and risk for each investor;
- The investment portfolio in practice can enable an investor to receive high yield in a relatively short time.

(Semenkova, 1997)

To emphasize, the essence of the investment portfolio is the distribution of the investment potential among the different assets, as it is impossible to find an asset that is highly profitable, liquid and reliable; a single security can maximum have two of the qualities.

Depending on what the goals and objectives are originally set by the investor in forming the investment portfolio a certain ratio is attained between the different investment assets in it.

The overall goal of the investment portfolio is attaining the highest yield at lowest acceptable risk. And to competently form such an investment portfolio which attains to the need or an investor is the goal of the management. The Modern Portfolio Theory by Markowitz, CAPM and alternative diversification will be now looked at with more detail. (Kasimov, 2005)

## **2.2 Modern Portfolio Theory**

In the end of the day any economic problem can be broken down to “the best allocation of resources”. Any economic entity, be it an individual, a corporation or a government is faced with a question of how to allocate in the best way the available resources- material, financial and human. The basis of the theory is that all entities are acting rationally and are thriving to maximize their wealth; the same concept lies in the investment theories.

The Modern Portfolio Theory (MPT) originated from a small article by H. Markowitz called "Portfolio Selection." In it he proposed a mathematical model of an optimal portfolio of securities, and also proposed the methods for constructing such portfolios under

certain conditions. Having examined the general practice of portfolio diversification, the professor showed how an investor can reduce his risk by choosing uncorrelated stocks/assets. After publishing the article Markowitz constantly worked on developing and improving the theory; which lead to publishing the book on the theory and receiving the Nobel Prize in Economics in 1990. (Kasimov, 2005)

The main merit of Mr. Markowitz is that he invented the concepts of "profitability" and "risk." His models calculations are based on the ratio between the risk of investment and its expected return using a probability distribution. Expected return of the portfolio securities is determined as the mean probability distribution, and risk - as the standard deviation of possible values from the expected yield. (Kasimov, 2005)

According to Markowitz, any investor should base their choice of the investment portfolio solely on the expected return,  $E(R)$  and standard deviation,  $\sigma$  of it. Thus, having carried out an assessment of different combinations of portfolios one has to choose the "best" combination, based on the ratio of expected return and standard deviation of these portfolios. However the common relation of yield- risk remains: the higher the yield, the higher the risk.

The goal of any investor is to compose a portfolio of securities, which would give the maximum possible impact at a minimum risk. Before building an investment portfolio it is necessary to define the term "efficient portfolio". Efficient portfolio – is such a portfolio, which provides:

- The maximum expected return for some level of risk, or
- The minimum level of risk for some expected return.

To understand the concept it is important to understand the relationship between correlation coefficient and risk of the portfolio. By analyzing the standard deviation values of different assets and their correlation the two conclusions can be derived:

- First, at the same correlation coefficient value values of  $\rho$ , two different portfolios can correspond to different values of standard deviation,  $\sigma$ . So for example, when the weight ratio of the securities in the portfolio changes the risk of the portfolio also changes.
- Second, the diversification effect is reached with the correlation coefficient approaching negative values to -1.

By taking different amounts of securities (2,3, 4, 5, ..., n), which have correlation coefficients between the pairs ranging from (- 1) to (+ 1), and creating portfolio of them, by also varying the "weights" of each, one can create a specific portfolio with a required

expected return  $E(R_p)$  and risk (standard deviation  $\sigma_p$ ). By plotting these combinations on scatter chart where x-axis is  $E(R_p)$  and y-axis is  $\sigma_p$  one can find the location of the minimum variance portfolio.

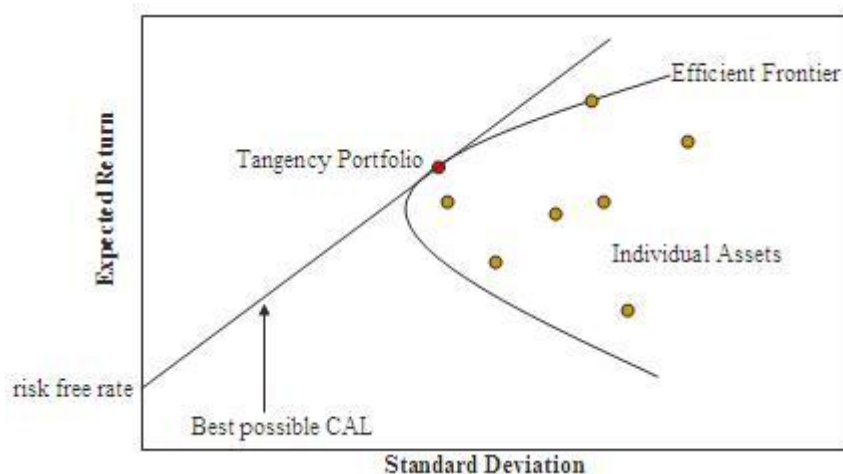


Figure 1 Markowitz Efficient frontier

From this scatter chart it can be seen that by varying the weights of the securities an infinite number of portfolio combinations can be created. However in order to create an infinite number of portfolios it must be assumed that each security can be divided, and that an investor can buy parts of bonds or stocks. Without this assumption the number of portfolios will be limited. The key to determining which combination to choose is such that an investor must select the optimal portfolio which lies on the efficient frontier. The essence of the theory is that the investor has to choose from the infinite number of combinations such a combination that will:

1. Maximize the expected return at each risk level;
2. Provide a minimal risk for each value of expected returns.

In other words it can be concluded that no matter what no matter which expected return the investor decides to approach, by changing the weights in the portfolio the combination can be found that will provide the minimum possible risk for it. (Kasimov, 2005)

Today Markowitz model is mainly used in the first stage of investment capital allocation of the portfolio, for different types of assets: stocks, bonds, real estate, etc. Sharpe's CAPM model is used in the second stage, when the capital invested in the particular segment of the market, is divided among particular assets making up the selected segment, so in specific stocks, bonds, assets.

### 2.2.1 Composing an investment portfolio

The fundamental principle of the portfolio theory is not to place all the investment in to one asset, to diversify. Diversification of investments plays a major role in lowering the risk of an investor.

The Modern Portfolio Theory allows the investor to create such a portfolio that will suit his views on expected return and risk levels.

In order to form an optimal portfolio it is necessary to analyze the potential assets separately from each other. Isolated analysis of the assets will determine the expected return of each asset, identify indicators of the risks associated with the asset and determine the relationship between assets. After analyzing the assets separately one can safely proceed with the formation of different weights combinations and thus determining the of profitability and associated risk.

Before proceeding to create the optimal portfolio and analyzing the art influence on it, it is important to define the components involved.

#### The expected return E(R)

It should be noted that the term "expected return" means the simple average. In order to determine the expected rate of return the data of the real returns of assets over a period of time must be attained.

The formula for calculating return is the following:

$$\frac{\text{Current}}{\text{previous}} - 1$$

After determining the values of expected asset returns, it is on to the calculation of risk.

#### Variance and standard deviation

Variance - a measure of the spread of possible outcomes with respect to the expected value. Therefore, the higher the variance, the greater is the spread, and hence the risk.

The formula for calculating the standard deviation is:

$$\sigma(r) = \sqrt{\frac{1}{N-1} \sum_{i=1}^N (x_i - r)^2}$$

Where:

$x_i$  - profitability of the asset

$r$  - the expected (average) return on asset

$n$  - number of observations.

It should be noted that it is not always an asset, with the highest standard deviation is the most risky. 3

Knowing the expected returns and risk measures (standard deviation), a few more calculations are required to determine the sample correlation coefficient. After calculating these ratios it will be possible to form portfolios that meet the requirements for risk and return.

#### Sample correlation coefficient

Correlation coefficient is “a measure that determines the degree to which two variable's movements are associated”. (Investopedia UCL)

The formula for calculating the correlation coefficient:

$$r = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{\left( n \sum x_i^2 - \left( \sum x_i \right)^2 \right) \left( n \sum y_i^2 - \left( \sum y_i \right)^2 \right)}}$$

Where:

$n$ = data count

$x$ =expected returns asset 1

$y$ = expected returns asset 2

The correlation coefficient ranges from -1 to +1. The value of +1 suggests that there is a positive relationship between the assets and thus follow in the same direction. This means that if one asset grows the other asset will also grow. The correlation coefficient

of -1 suggests a negative strong correlation, so the growth of one of the assets accompanied by a fall of another. A value of 0 indicates no correlation. (Kasimov, 2005)

Sample Correlation Coefficient	Interpretation
$0.3 \leq r \leq 1.0$	Positive relation
$-0.3 \leq r \leq 0.3$	Random relation
$-1.0 \leq r \leq 1.0$	Negative relation

Table 1 Ranges of sample correlation coefficient

### Minimum Variance Portfolio

To find the optimal portfolio, minimum variance portfolio, it is necessary to determine the best feasible set of relation between risk and expected return, that lies on the efficient frontier constructed by the investor from different combinations of weights of the assets in the portfolio.

Efficient frontier is a line that defines a set of efficient portfolios. Portfolios that lie on the left of the efficient frontier cannot be applied because they do not belong to the feasible set. Portfolios to the right (internal portfolios) and below the efficient frontier are inefficient because there are portfolios that at a given level of risk offer higher yields or lower risk for a given level of profitability.

Formulas expected return and standard deviation of a portfolio of two assets are as follows:

$$E(R_p) = w_1 E(R_1) + w_2 E(R_2)$$

$$\sigma_p = \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1 w_2 \sigma_1 \sigma_2 \rho}$$

Where:

E(R1)= Expected return on an asset 1

E(R2)= Expected return on an asset 1

W1=weight of the asset 1 in the portfolio

W2= weight of the asset 2 in the portfolio

$\sigma_i$ =standard deviation of the asset

$\rho$ =sample correlation coefficient



The following formula is then used to calculate the weights for the assets in the portfolio that will yield the minimum variance portfolio.

$$w_1 = \frac{\sigma_2^2 - \sigma_1\sigma_2\rho}{\sigma_1^2 + \sigma_2^2 - 2\sigma_1\sigma_2\rho}$$

$$w_2 = 1 - w_1$$

$W_1$ =weight of the Alternative asset (Art) in the portfolio

$W_2$ =weight of the Common stock in the portfolio

$\sigma_i$ =standard deviation of the asset

$\rho$ =sample correlation coefficient

(Kasimov, 2005)

## 2.3 Capital Asset Pricing Model

In the 60's, Markowitz's student, William Sharpe introduced the Capital Asset Pricing Model( CAPM) which elaborated on the MPT. CAPM works by finding a ratio between risk and expected returns. With the model it is possible to determines the desired level of return on the asset, which is to be added to the already well-diversified portfolio, taking into account the market risk of the asset; it can be used to calculate the return of the investment portfolio, an individual security as well as it is the most common method used in pricing equity. Today it is the most influential financial theory in the world and a guideline for entities in assessing the long term investment strategies. (Investopedia UCL)

Capital Asset Pricing Model is based on the postulates of the Markowitz Modern Portfolio Theory as well as some additional assumptions:

Investment portfolios are evaluated on the basis of expected return and standard deviation in the duration of the investment

When choosing between two equal value portfolios and investor will chose one with higher returns

All investors are risk averse and will prefer the portfolio with minimum standard deviation

Assets are all liquid and indivisible

An investor has an ability to lend and borrow funds with a risk free interest rate

Transaction costs and taxes are overlooked at minimum levels

The holding period is equal for all investors and the expected return is homogenous.

“These assumptions enable to used the CAP Model in perfect market conditions.

CAPM's starting point is the risk free rate - typically a 10-year government bond yield.

To this is added a premium that equity investors demand to compensate them for the extra risk they accept. This equity market premium consists of the expected return from

the market as a whole less the risk-free rate of return. The equity risk premium is multiplied by a coefficient that Sharpe called ‘beta’.” (McClure, 2010)

CAPM model has strengths and weaknesses. Its main advantage is to provide unambiguous and easy to understand information about the relationship between expected return

and risk, it is the most widely used model for the investors. On the other hand, CAPM

assumes use of a priori values of variables not available in the analyst estimates of profitability are potentially misleading. It is often mentioned that the main drawback of

CAPM – is the assumption of one factor effect and that it does not take into account many effects on the profitability and does not analyze them. (Kasimov, 2005)

### **3 ALTERNATIVE INVESTMENTS**

To best describe Alternative Investments (AI), it is best to say what they are not. AI are

all investment except the traditional assets such as stocks, cash and bonds. Often when mentioning alternative investment, what comes to mind are hedge funds, managed fu-

tures, real estate, commodities, derivatives contracts, arts, precious metals and wine (Investopedia ULC). Alternatives are a perfect complement to the standard assets. Each

AI inherits its unique characteristics of risk return ratio and also each has a variable investment period. The key and most attractive distinction of the AI compared to the tra-

ditional assets is its non correlation with the constantly fluctuating stock markets. Thus by adding the AI to ones investments portfolio greater diversification can be achieved,

with lowering or risk and increasing the yield. (Saelensminde, 2010) The lack of knowledge about alternative assets and their possible benefits to the portfolio diversifi-

cation are a result of the common unconscious assumptions in the society. “The common view is very much that bonds and equities are essential, while everything else is an optional extra and quite possibly an unnecessary luxury. This has led in turn to some dramatically undiversified portfolios particularly among pension funds, who ironically are often the only class of investors to be under a legal duty to diversify their assets.” (Fraser-Sampson, 2011, p. 5)

How ever the limitations that come to mind when dealing with the some alternative assets are their low liquidity, they are unquoted and that they require care and maintenance. (Fraser-Sampson, 2011)

### **3.1 Hedge funds, futures and derivatives**

As previously mentioned, the fact that the AI’s returns have a lower correlation than the traditional assets attracts not only individual investors but also many large institutional funds. It became a common practice for the private and pension funds to invest a small portion of their portfolio in to alternatives such as hedge funds. (Investopedia ULC) Hedging is a traditional method of managing and lowering the risk of the investments on the market. According to the Britannica encyclopedia “hedging is the method of reducing the risk of loss caused by price fluctuation. It consists of the purchase or sale of equal quantities of the same or very similar commodities, approximately simultaneously, in two different markets with the expectation that a future change in price in one market will offset by an opposite change in other market.” Hedging is linked with the futures contracts which are being constantly bought and sold. “The hedger thus hopes to protect himself against loss resulting from price changes by transferring the risk to a speculator who relies upon his skill in forecasting price movements. Selling futures is called a short hedge; buying futures is called a long hedge. Hedging is also common in the securities and foreign- exchange markets.” (Encyclopædia Britannica)

As a result, hedging is not a tool for increasing profitability; it is an instrument for lowering the risk of certain transactions as well as of whole investment portfolios.

### **3.2 Real estate**

Real estate investment is maybe the most common form of investment for many people without even realizing. People buy their first homes and by that already make an investment in to their future. However, when talking about alternative investments and more serious investors, real estate investment has a slightly different meaning. Following the definition from investopedia, real estate investment is purchasing property to generate a constant profit by renting it out to tenants, be it business or private. Investment can be made in to the primary markets, construction and new objects or onto the secondary real estate markets where already existing objects are transferred. (Investopedia ULC). Real Estate as an alternative investment can include in itself income producing property, land and housing.

There can be identified a few ways of driving income from real estate investment

Income from renting out the property

An increase in one's own invested capital from a steady increase of the real estate market price

With the successful re-sale of the property an large profit can be made.

As with any investments information and knowledge of the market is core in choosing the real estate for investment. Investment into housing would be the most popular, and a consistent demand for it provides a steady rise in price and a lower risk. Land investments can be riskier as there are many factors influencing it such as economical, legal and political. And most profitable as well as most risky type of real estate investment is considered investments in to income producing properties as it not as liquid as traditional investments and results are longer to be awaited for. (Tatarova, 2003)

### **3.3 Commodities**

Commodities is a large group of alternative assets which can include in itself many different asset types, they represent the substances that can be either used as raw materials or as means of productions by industrial companies around the world. Commodities are all physical investments, but each can in its purest be transmuted into its physical form. (Fraser-Sampson, 2011) Historically, investors have considered two ways of investing in commodities by buying raw materials and storing them for future re- sale or purchas-

ing shares of commodity companies. In the recent years the investment in to commodities significantly increased due to the growing attraction of the futures market and other financial instruments. Primarily ETFs (exchange traded funds (EFT), whose value is tied to the commodity indexes like S & P Goldman Sachs Commodity Index, UBS Constant Maturity and Deutsche Bank Commodity Index.

In any case commodity investment is considered as a safe heaven as its investing in a physical asset, value of which can't go to zero. (Fraser-Sampson, 2011, p. 10)

### **3.4 Precious metals**

Precious metals are another form of alternative investment. Historically such investments have seen a rise in demand when the traditional financial instruments have failed, in the times of instability and markets collapses. The attraction for investors to allocate parts of their wealth in to the precious metals can be broken down to:

Metals are virtually indestructible and cannot be falsified, they are long term investment They have a high liquidity, especially gold and silver and are demanded all over the world which cannot be said about many other AI's

Precious metals provide a good diversification tool to investors due to their correlation with the market. Inclusion in to the portfolio can protect the investor against the fluctuations of the markets.

One quarter of the world's gold reserves are held by the government's central banks and other financial institutions as part of their international reserves. Precious metals are an asset and the yield from them does not depend on the performance of individuals or corporations.

There are traditionally four precious metals to invest in Gold, Platinum, Palladium and Silver. "Holding metals is a way of spreading portfolio risk during times of economic upheaval and war, and when inflation threatens currency values. To many people in this uncertain environment, buying metals represents a safe-haven approach to diversification and a partial hedge against equities." (Michael Sanibel, 2010) According to Michael Sanibel of Forbes magazine- "Gold recently reached an all-time high of \$1,252 per ounce, but is still well below the \$873 reached in 1980 when adjusted for inflation. It's up about 300% in the past five years and has displayed a fairly consistent uptrend during that period. Platinum reached a high of \$2,252 in 2008, but has backed off to the

\$1,500 area. When automobile manufacturers went on a buying binge in 2000 and 2001, the supply squeeze pushed the price of palladium to almost \$1,100. It is now selling for less than half that amount. Silver is currently within striking distance of its 2008 high of \$20.” (Michael Sanibel, 2010)

### **3.5 Arts**

In the past years the world has seen a great, sudden increase in the number of high net worth individuals from the emerging markets like China, India and the Middle East which in return developed in to a high demand for luxury goods of all sort. These days many experts advise investors to turn their attention to the arts. «Last September there were only 12 active art funds across the globe. Now there are 41 in development»- says Money Week’s journal writer Ruth Jackson. (Jackson, 2011) Many believe that this type of investment requires immense funds, however arts value range from thousands to millions of Dollars. The main objective is for the investor to spot what work of art will grow best in value. The tendency today seems to be such that art dealers are working with a new type of investor, an investor who understands art and wants to buy an art piece or sculpture for a lower price and with an intention of yielding a higher return in the future. These tendencies can be observed by looking at the auctions of the large auction houses like Christies, where just recently an auction of arts and sculptures under a thousand took place.

## **4 LURE OF ALTERNATIVE INVESTMENTS**

Alternative assets seem to be all around us and yet they are considered to be alternative investment and assumed to be minor. “The Yale Endowment embraced the diversification possibilities brought by the inclusion of alternative assets into the portfolio, in the recent years alternative assets have generally totaled to about 65% of their asset allocation.” (Fraser-Sampson, 2011, s. 6)

Art can be classified as a private asset type as its underlying investment entity is not publicly quoted. Low liquidity is one of the key properties of almost any kind of alternative investments, art maybe even more so. In order to gain valuable returns on art one must be a patient long term investor who can choose a moment when to sell instead of a

short term investor. Long-term ownership is the second common characteristic to describe art as an investment, which may be 5-10 years or more. Long-term ownership of art investment is the result of their first property - illiquidity. In many cases, there is negative correlation between alternative investments and traditional investment assets. Due to such property a portfolio can be more diversified, which is unattainable in the presence of only the traditional classes of financial assets in the portfolio. (Fraser-Sampson, 2011)

For those interested in investing in art the information is not always available, the investor must carry out a deeper analysis for effective evaluation of the art piece or fund before including it in the portfolio. Such an analysis should cover all kinds of transaction costs, managerial skill, as well as the level of risk that an investor can take up on.

#### **4.1 Art funds**

In the year 1904 in France a group of 13 investors led by a financier Andre Level formed a first form of an Art investment fund “La Peau de l'Ours”. Having collected together a sum of three thousand francs, they purchased one hundred paintings and drawings, among which were the early Picasso and Matisse. For about ten years the paintings were hanging on the wall of the investors when in 1914 all of them were sold at a large auction in Paris. It was found that the original investment has grown nearly four times, with individual paintings going up more than 10 times! (Surowiecki, 2005)

Another wide spread example that excites investors is the success of the British Rail Pension Fund, who allocated 2.5% of their funds in to 2500 paintings in the 1970s in an attempt to out stage inflation in the UK. In the next 25 years the fund made 300 million USD from the investment and supported the argument of the risk diversification qualities art investment can bring. (Fraser-Sampson, 2011)

Such successful stories show the capabilities and potential of Art investment funds!

Art however is still considered an emotional asset which people high-net worth individuals buy rather for pleasure and status than for large profit gains.

## 4.2 Demand

To quote Anatoly Milukov, the executive vice president of Gazprombank “Alternative investments gained its widespread demand in the West after the crisis of 2000, when the market became highly volatile and there was a clear declining trend. Meanwhile investors still had plenty of cash. In particular, we are talking about institutional investors, pension funds, in which funds are received continuously, and high-net worth clientele. By observing the market situation, these categories of investors thought about the need to invest in instruments which are not subjected as strongly to daily market fluctuations. As a result the world saw a widespread popularity of hedge funds, art - banking, investment in antiques and wine.” (Alexander Mazunin, *Коммерсантъ Daily*, 2008)

Since it is widely considered in finance that “the risk of any investment may be measure by the volatility of its historic returns, customarily expressed as ne standard deviation”, two assumptions can be made:

“1. Provided you have a large enough samples of historic returns available for analysis then normal distribution will always apply

2. That past performance is a good guide to what is likely to happen in the future.” (Fraser-Sampson, 2011, p. 21) This historical data can allow assessing the volatility of the art investment. Volatility by it self is key factor when making an investment decision, as it shows “volatility refers to the amount of uncertainty or risk about the size of changes in a security's value. A higher volatility means that a security's value can potentially be spread out over a larger range of values. This means that the price of the security can change dramatically over a short time period in either direction. A lower volatility means that a security's value does not fluctuate dramatically, but changes in value at a steady pace over a period of time.” (Investopedia UCL)

## 5 APPLICATION OF THE MPT WITH THE INCLUSION OF THE ART MARKET INDEX

In the second half of the twentieth century the idea prevailed that the portfolio comprised of risky assets was also open to high risk. In 1959, Markowitz developed a mathematical scheme of choosing the optimal portfolio, which concentrates attention on the



behavior of the portfolio, rather than separately analyzing its components. It fundamentally changed the view of the investment process.

As discussed before, the key financial concept is the understanding the positive relationship between risk and the expected return. In this section the Modern Portfolio Theory (MPT) and the Capital Asset Pricing Model (CAPM) will be applied to two Indexes MEI MOSES® ALL ART WORLD INDEX© and MSCI World Index©. Due to privacy terms and conditions the data will not be showed in the thesis only the results and the conclusions will be provided.

The correlation between the two Indexes will be analyzed to see if adding an alternative asset, Art, will affect the risk level of the portfolio. Also the minimum variance portfolio will be established.

The world has a large collection of data regarding the stock markets performances due to the large demand for the movement indexes. However less information is provided on the Art sales indexes, as the area has a limited followers group.

One of the leading Art Indexes, “most often quoted by the media in the analysis of the financial returns of the art market”, is MEI MOSES® ALL ART WORLD INDEX© provided by the Beautiful Asset Advisors LLC©. (Beautiful Asset Advisor LLC)To take a global view on the on the common stock movements an MSCI World index was attained for the same period from 1969 to 2005. (MSCI Inc.©)

The main task in the process of forming the optimal portfolio is finding the optimal way of allocating investors resources in to various assets in such a way that the returns are maximized while the risk is minimized.

If an investor has a choice between a few possible portfolios, the optimal portfolio is the most preferred one.

To plot the available data to see a potential in its correlation, the MEI MOSES® ALL ART WORLD INDEX© will be converted to the base of a 100 similar to the state of the MSCI© World Index.

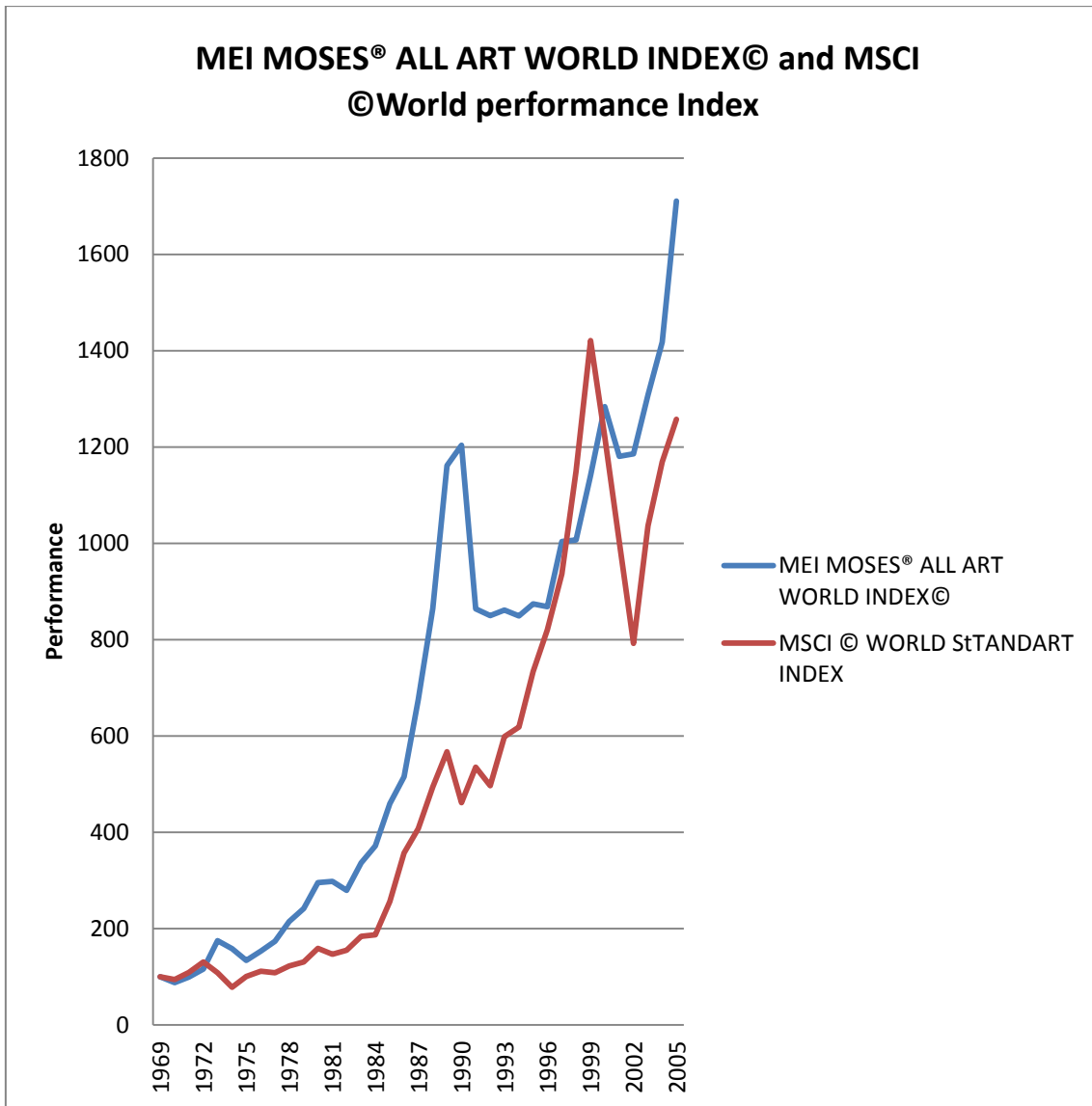


Figure 2 Chart. MEI MOSES® ALL ART WORLD INDEX© and MSCI© World Performance Index (MSCI Inc.©) and (Beautiful Asset Advisor LLC)

From the chart represented by Figure 2, a clear overall growth trend is seen in the value of both the world and art indices. With a bare eye it can be observed that the trend is when the World index starts to fall the art index grows in value. However this trend is not observed on the whole period of the graph, which indicated that there is likely not to be a negative correlation between the two assets types.

## 5.1 Composing and investment portfolio

Based on historically realized returns a Sample Correlation Coefficient can be found in excel using this formula.

$$r = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{\left( n \sum x_i^2 - \left( \sum x_i \right)^2 \right) \left( n \sum y_i^2 - \left( \sum y_i \right)^2 \right)}}$$

Where:

n= data count

x=expected returns of MEI MOSES® ALL ART WORLD INDEX©

y= expected returns of MSCI© World Performance Index

r=p= 0,170771025

## 5.2 Finding the relationship between risk and return for the theoretical portfolio

In the data spread sheet the average E( R) for each asset was found as well as the Standard deviation. The results are displayed in the table below.

	MEI MOSES® ALL ART WORLD INDEX©	MSCI © WORLD STANDART INDEX
Expected return, E(Ri)	9,90 %	9,04 %
Standard Deviation, σ	15,38 %	16,79 %

Table 2 Results for the Standard Deviation and Expected Return of MEI MOSES® ALL ART WORLD INDEX© and MSCI© World Performance Index

With this data the process of creating an efficient frontier may begin by following the theoretical frame work above.

$$E(R_p) = w_1 E(R_1) + w_2 E(R_2)$$

$$\sigma_p = \sqrt{w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1 w_2 \sigma_1 \sigma_2 \rho}$$

Where:

$E(R_1)$ = Average expected returns of MEI MOSES® ALL ART WORLD INDEX©

$E(R_2)$ = Average expected returns of MSCI© World Performance Index

$W_1$ =weight of the Alternative asset (Art) in the portfolio

$W_2$ =weight of the Common stock in the portfolio

$\sigma_i$ =standard deviation of the asset

$\rho$ =sample correlation coefficient

The results can be seen in the table below:

w1	w2	Expected Return	Standard Deviation
1	0	9,90 %	15,38 %
0,9	0,1	9,81 %	14,22 %
0,8	0,2	9,73 %	13,29 %
0,7	0,3	9,64 %	12,64 %
0,6	0,4	9,56 %	12,31 %
0,5	0,5	9,47 %	12,31 %
0,4	0,6	9,39 %	12,67 %
0,3	0,7	9,30 %	13,34 %
0,2	0,8	9,21 %	14,28 %
0,1	0,9	9,13 %	15,45 %
0	1	9,04 %	16,79 %

Table 3 Combinations of Expected Returns and Standard Deviation (Beautiful Asset Advisor LLC)(MSCI Inc.©)

This table shows different combination of possible expected return in relation to the risk, by adjusting the presence weights of each asset in the theoretical portfolio. What can be seen is represented in the plotted graph below. The data gives an efficient frontier for this particular portfolio.

If an investor allocates all the funds just into the Alternative investment of art, the expected return will be 9,9 % with a risk level of 15,38%. Where is if an investor allocates all the funds into the stock market then the expected return will be 9,04% with a risk level of 16,79%. This numbers show the stock market has been more volatile over the years thus yielding a higher risk value. As well as proved the theory that the Art market has seen substantial demand thus growth of its value over the past years.

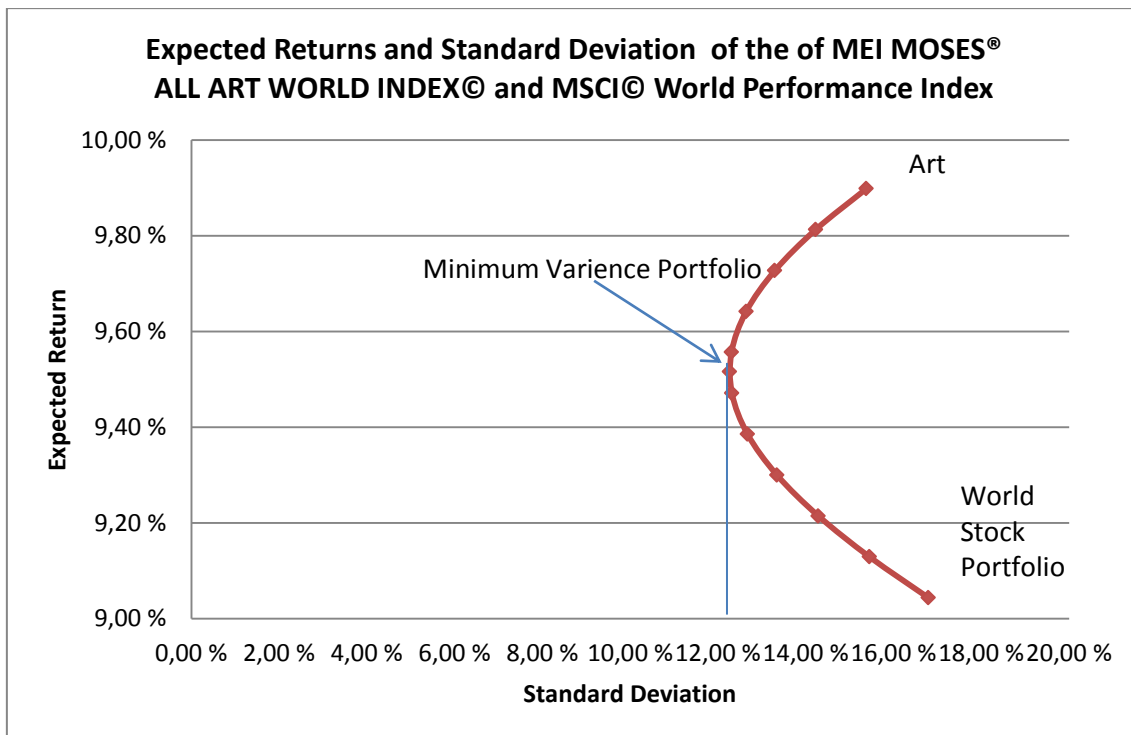


Figure 3 Expected Returns and Standard Deviation of the of MEI MOSES® ALL ART WORLD INDEX© and MSCI© World Performance Index

The best possible combination of an alternative asset, Art , will be determined by finding the minimum variance portfolio. This will show the weight combination for the assets which will give the best yield-risk ratio for an investor. The formulas from the theoretical framework above were used.

$$w_1 = \frac{\sigma_2^2 - \sigma_1\sigma_2\rho}{\sigma_1^2 + \sigma_2^2 - 2\sigma_1\sigma_2\rho}$$

$$w_2 = 1 - w_1$$

$W_1$ =weight of the Alternative asset (Art) in the portfolio

$W_2$ =weight of the Common stock in the portfolio

$\sigma_i$ =standard deviation of the asset

$\rho$ =sample correlation coefficient

The calculations delivered these findings.

w1	w2	Expected Return	Standard Deviation
0,55	0,45	9,52 %	12,27 %

*Table 4 Minimum Variance Portfolio*

These numbers suggest that by creating a portfolio which will comprise of 55% of an investment in an Art asset and 45% into the common stock will yield an expected return of 9,52% with a standard deviation of 12,27% thus lowering the risk value for both asset types and with that proving the diversification attributes of the Modern portfolio theory.

## 6 CONCLUSION

The main conclusions of the modern portfolio theory can be summarized as following:

The investor will most likely chose an optimal portfolio out of the combinations of portfolios along the efficient frontier line

Portfolio diversification bring with it self the reduction of risk of the investments, since the standard deviation of the portfolio will be lower than the standard deviation of a single security comprising this portfolio

The yield of the markets index does not reflect the full yield of the security, errors must be taken in consideration

Based on the statistical data an investor can estimate an expected return of an asset as well as its covariance with another asset to use as a diversification tool

The comparison between possible portfolios is based on the expected return and risk level

An investor will chose a portfolio with a lower risk , presuming the yield is the same

The central problem in the modern portfolio theory is the choice of the most efficient portfolio for the investor, which means defining of a combination of assets with the highest yield at the lowest or a given level of investment risk.

It is important to understand that the research provides knowledge not experience, and a good combination of both is what can give a best risk diversified investments.

The findings indicate that there is no straight correlation between the Art investment and the stock market, this can be seen from the sample correlation coefficient of  $r = 0,170771025$ . If it was  $-1$ , it would indicate that the assets are negatively correlated, thus being a great diversification tool in minimizing the risk. In this case the correlation factor is random thus not guaranteeing the same effects. Never the less the correlation coefficient shows that there are diversification benefits provided by the inclusion of an asset, since it is still less than 1. However the risk of the portfolio overall can be lowered, as shown by the calculations, while providing almost as high return if investing just into Art.

The findings of the minimum variance portfolio suggest that 55% of an investors assets should be allocated to investment in Art where the other 45% in to the common stock. This however should not be taken as it is and considered an absolute truth, further studies and more detailed calculations may lead to totally different proportions of assets distribution.

To conclude an alternative investment will help diversify the portfolio. Art in particular has shown that even without a negative correlation it can help to reduce the overall risk. However art is still an expensive asset to use for such purposes. Its benefits as a diversification tool has given rise to Art funds around the world giving investors will lower investing power to benefit from its characteristics. One however must really understand an alternative asset before investing in it in order to maximize the benefit it provides! Knowledge is the key!

## 7 RECOMMENDATIONS

As some of the recommendations for the future studies of the topic can be as followed:

1. Find an index comprised on a quarterly basis instead of 1 year as well as a longer and more recent set of data
2. Evaluate the possible diversification opportunities by adding a third asset
3. Compare the diversification level provided by an alternative investment , Art and for example Gold
4. Find the demand periods for the Art, and correlate them with the economic situations during that time, i.e. financial crisis.
5. Conduct an interview with an expert in the field.
6. What is the correlation observed in demand for the alternative investments?
7. When is the best time to acquire alternatives as part of the investment portfolio?



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## APPENDICES